REMARKS

In view of the above amendments and the following remarks, reconsideration and further examination are requested.

Claims 10 and 18 have been canceled in favor of new claims 31 and 32, respectively. Claims 9, 11-17, 19-23, 25, 26, and 28-32 are pending.

In item 2 beginning on page 2 of the Office Action, Claims 9, 10, 13-18, and 21-30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ando ((US 2002/0060958) in view of Miyauchi (US 4,283785). This rejection is traversed and is inapplicable to claims 9, 10, 13-18, and 21-30 as amended for the following reasons.

As an initial matter, it is noted that the Examiner has not listed the Miyauchi reference on a form PTO-892. Therefore, it is requested that the Examiner please cite the Miyauchi reference on a PTO-892 form in order to make the reference formally of record.

Claim 9 as amended recites output controlling means for storing learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and controlling the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detecting means.

Ando does not disclose or suggest output controlling means for storing learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and controlling the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detecting means as recited in claim 9.

The Examiner asserts that a hologram element 20A of Ando stores learned data. Office Action, page 2 last line. This assertion by the Examiner is incorrect. There is no disclosure in the Ando reference that the hologram element stores such data. Also, "current" cannot be stored. The hologram element 20A of Ando does not store the "current as given in paragraph 0391," which is asserted by the Examiner as being learned data. Thus, Ando does not disclose or suggest an output controller operable to store learned data.

The Examiner asserts that the hologram element "20A stores learned data indicating a relation between a driving amount to be inputted to the wavefront converting means and the output of the light source (paragraph 0233)." Office Action page 2, last line, to page 3, line 2. This assertion by the Examiner is incorrect. The following is what paragraph 0233 discloses regarding the hologram element 20A: "an optical element (hologram element 20A) having a light splitting function for focusing light (LB) from the light source (10) onto a plurality of focusing positions on the recording surface of the information medium (100)." There is no disclosure or suggestion in this passage of the storage of any data, let alone the storage of learned data indicating a relation between a driving amount to be inputted to the wavefront converting means and the output of the light source.

The Examiner asserts that the hologram element 20A controls the output of the light source. Office Action, page 3, lines 2-3. The recitation in claim 9 is that the output controlling means controls the light source. The hologram element 20A does not control the light source.

The Examiner asserts that the hologram element 20A "controls the output of the light source based on the driving amount to be inputted to the wavefront converting means." Office Action, page 3, lines 2-3. This assertion by the Examiner is incorrect. The Examiner asserts that elements 50 and 52 shown in Fig. 6 of Ando are the wavefront converting means. Ando shows element 54 as the driving coil for this asserted wavefront converting means. The drive coil 54 is connected to element 500. Thus, as disclosed by Ando, the driving amount comes from element 500. As shown in Fig. 6, Ando does not disclose or suggest any feedback from the photodetector 90A, or any of elements 94, 92, 96, 201-208, 600, 400, 300, or 500 to the hologram element 20A. Therefore, there is no disclosure or suggestion in Ando that the hologram element 20A controls the output of the light source based on the driving amount to be inputted to the wavefront converting means.

The Examiner asserts that the hologram element 20A "controls the output of the light source based on the driving amount to be inputted to the wavefront converting means and the learned data. ("learned data" is current as given in paragraph 0391)." Office Action, page 3, lines 2-4. This assertion by the Examiner is incorrect. As recited in claim 9, "learned data" is data "indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source." However, "current as given in paragraph 0391" is not "learned data indicating correlation

between driving amounts of the wavefront converter and outputs of light of the light source." The current referred to by the Examiner is set forth in paragraph [0391] as the "current from driving current supply circuit 281 to defocusing correction driving coil 62," and is not the driving amount for the driving coil 54 of the asserted wavefront converting means 50, 52. The current relied on by the Examiner does not indicate anything about the driving amount of the wavefront converter and is therefore not "learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source" as recited in claim 9, and it follows that Ando does not disclose or suggest that the hologram element 20A controls the output of the light source based on learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source. Moreover, it also follows that Ando does not disclose or suggest the hologram element 20A "controlling the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detecting means" as recited in claim 9.

As set forth above, Claim 9 as amended recites output controlling means for storing learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and controlling the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detecting means. The Examiner acknowledges that "Ando et al. does not specifically teach that the light source itself is controlled." Office Action, page 3, lines 6 and 7. The Examiner points out that Miyauchi teaches controlling the light source so as to control the output of light by the light source. Office Action, page 3, lines 7-9. However, neither Ando nor Miyauchi disclose or suggest controlling the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detecting means (to the wavefront converter to reduce the detected aberration amount) as recited in claim 9. Rather, Miyauchi discloses controlling the laser to deal with duty cycle changes. Thus, no combination of Ando with Miyauchi would result in the invention recited in claim 9, particularly the output controlling means for storing learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and

controlling the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detecting means (to the wavefront converter to reduce the detected aberration amount).

Claim 16 as amended recites storing in advance learned data indicating correlation between outputs of light of the light source and driving amounts by which a wavefront converter is to be operated to reduce an aberration, and setting the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent in said sending.

Ando does not disclose or suggest storing in advance learned data indicating correlation between outputs of light of the light source and driving amounts by which a wavefront converter is to be operated to reduce an aberration, and setting the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent in said sending as recited in claim 16.

As discussed above, there is no disclosure in the Ando reference of storing learned data, or of storing learned data indicating a relation between a driving amount to be inputted to the wavefront converter and the output of the light source. Also as discussed above, as disclosed by Ando, see Fig. 6, the driving amount comes from element 500 and Ando does not disclose or suggest any feedback from the photodetector 90A, or any of elements 94, 92, 96, 201-208, 600, 400, 300, or 500 to the hologram element 20A. Therefore, there is no disclosure or suggestion in Ando of setting the output of the light source based on the driving amount to be inputted to the wavefront converting means.

As recited in claim 16, "learned data" is data "indicating correlation between outputs of light of the light source and driving amounts by which a wavefront converter is to be operated to reduce an aberration." Ando does not disclose such learned data. See the discussion above. Thus, Ando does not disclose or suggest setting the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent in said sending as recited in claim 16..

The Examiner acknowledges that "Ando et al. does not specifically teach that the light source itself is controlled." Office Action, page 3, lines 6 and 7. The Examiner points out that Miyauchi teaches controlling the light source so as to control the output of light by the light source. Office

Action, page 3, lines 7-9. However, neither Ando nor Miyauchi disclose or suggest setting the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent in said sending as recited in claim 16. Rather, Miyauchi discloses controlling the laser to deal with duty cycle changes. Thus, no combination of Ando with Miyauchi would result in the invention recited in claim 16, particularly the setting the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent in said sending.

Claim 17 as amended recites an output controller operable to store learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and to control the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detector.

Ando does not disclose or suggest an output controller operable to store learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and to control the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detector as recited in claim 17.

The Examiner asserts that a hologram element 20A of Ando stores learned data. Office Action, page 6, line 13. This assertion by the Examiner is incorrect. There is no disclosure in the Ando reference that the hologram element 20A stores such data. Also, "current" cannot be stored. The hologram element 20A of Ando does not store the "current as given in paragraph 0391," which is asserted by the Examiner as being learned data. Thus, Ando does not disclose or suggest an output controller operable to store learned data.

The Examiner asserts that the hologram element "20A stores learned data indicating a relation between a driving amount to be inputted to the wavefront converting means and the output of the light source (paragraph 0233)." Office Action page 6, lines 13-15. This assertion by the Examiner is incorrect. The following is what paragraph 0233 discloses regarding the hologram element 20A: "an optical element (hologram element 20A) having a light splitting function for

focusing light (LB) from the light source (10) onto a plurality of focusing positions on the recording surface of the information medium (100)." There is no disclosure or suggestion in this passage of the storage of any data, let alone the storage of learned data indicating a relation between a driving amount to be inputted to the wavefront converting means and the output of the light source.

The Examiner asserts that the hologram element 20A controls the output of the light source. Office Action, page 3, lines 2-3. The recitation in claim 17 is that the output controller controls the light source. The hologram element 20A does not control the light source.

The Examiner asserts that the hologram element 20A "controls the output of the light source based on the driving amount to be inputted to the wavefront converting means." Office Action, page 6, lines 15-16. This assertion by the Examiner is incorrect. The Examiner asserts that elements 50, 52, and 54 shown in Fig. 6 of Ando are the wavefront converter. Ando shows element 54 as the driving coil for this asserted wavefront converting means. The drive coil 54 is connected to element 500. Thus, as disclosed by Ando, the driving amount comes from element 500. As shown in Fig. 6, Ando does not disclose or suggest any feedback from the photodetector 90A, or any of elements 94, 92, 96, 201-208, 600, 400, 300, or 500 to the hologram element 20A. Therefore, there is no disclosure or suggestion in Ando that the hologram element 20A controls the output of the light source based on the driving amount to be inputted to the wavefront converting means.

The Examiner asserts that the hologram element 20A "controls the output of the light source based on the driving amount to be inputted to the wavefront converting means and the learned data. ("learned data" is current as given in paragraph 0391)." Office Action, page 6, lines 15-17. This assertion by the Examiner is incorrect. As recited in claim 17, "learned data" is data "indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source." However, "current as given in paragraph 0391" is not "learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source." The current referred to by the Examiner is set forth in paragraph [0391] as the "current from driving current supply circuit 281 to defocusing correction driving coil 62," and is not the driving amount for the driving coil 54 of the asserted wavefront converting means 50, 52, 54. The current relied on by the Examiner does not indicate anything about the driving amount of the wavefront converter and

is therefore not "learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source" as recited in claim 17, and it follows that Ando does not disclose or suggest that the hologram element 20A controls the output of the light source based on learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source. Moreover, it also follows that Ando does not disclose or suggest that the hologram element 20A, or any output controller, is operable to "control the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detector" as recited in claim 17.

As set forth above, Claim 17 as amended recites an output controller operable to store learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and to control the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detector. The Examiner acknowledges that "Ando et al. does not specifically teach that the light source itself is controlled." Office Action, page 6, lines 18-19. The Examiner points out that Miyauchi teaches controlling the light source so as to control the output of light by the light source. Office Action, page 6, lines 18-20. However, neither Ando nor Miyauchi disclose or suggest controlling the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detector (to the wavefront converter to reduce the detected aberration amount) as recited in claim 17. Rather, Miyauchi discloses controlling the laser to deal with duty cycle changes. Thus, no combination of Ando with Miyauchi would result in the invention recited in claim 17, particularly the output controller operable to store learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and to control the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the driving amount sent by the aberration detector (to the wavefront converter to reduce the detected aberration amount).

In item 3 on page 10 of the Office Action, claims 11 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ando in view of Miyauchi and Itou (US 2002/0024736). This rejection is traversed.

First, it is noted that the Examiner did not state the Miyauchi reference in the statement of the rejection, but based on the Examiner's comments, it is assumed that this rejection is based on Ando, Miyauchi, and Itou.

Claims 11 and 19 depend from claims 9 and 17, respectively. As discussed in detail above, no obvious combination of Ando and Miyauchi discloses or suggests the inventions recited in claims 1 or 17. Moreover, Itou does not provide the missing disclosure by Ando and Miyauchi of the features recited in claims 1 and 17, nor was Itou relied on by the Examiner as providing such disclosure. Thus, no obvious combination of Ando, Miyauchi, and Itou would result in, or otherwise render obvious, the inventions recited in claims 1 and 17, or dependent claims 11 and 19.

In item 4 on page 11 of the Office Action, claims 12 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ando in view of Miyauchi and Yoshida (US 6,381,074). This rejection is traversed.

First, it is noted that the Examiner did not state the Miyauchi reference in the statement of the rejection, but based on the Examiner's comments, it is assumed that this rejection is based on Ando, Miyauchi, and Yoshida.

Claims 12 and 20 depend from claims 9 and 17, respectively. As discussed in detail above, no obvious combination of Ando and Miyauchi discloses or suggests the inventions recited in claims 1 or 17. Moreover, Yoshida does not provide the missing disclosure by Ando and Miyauchi of the features recited in claims 1 and 17, nor was Yoshida relied on by the Examiner as providing such disclosure. Thus, no obvious combination of Ando, Miyauchi, and Yoshida would result in, or otherwise render obvious, the inventions recited in claims 1 and 17, or dependent claims 12 and 20.

New claims 31 and 32 are allowable over the prior art of record in view of the remarks above with respect to claims 9 and 17, respectively, and in view of the fact that no combination of Ando and Miyauchi discloses or suggests output controlling means for storing (or an output controller operable to store) learned data indicating correlation between amounts of driving of the wavefront

converter and outputs of light of the light source, and controlling (or to control) the light source so as to set the output of light outputted by the light source to an output of light indicated in the learned data as correlating to the amount of driving detected by the driving amount detecting means (or driving amount detector).

Because of the distinctions discussed above, claims 9, 11-17, 19-23, 25, 26, and 28-32 are allowable over the prior art of record.

Moreover, the present invention solves the problem that arises when an optical recording medium has multiple data layers and both a normal aberration (e.g., a third-order spherical aberration) and an aberration having a high-dimension (e.g., aberration of fifth and higher order) are generated, and total aberrations including aberration of normal and higher orders with respect to a respective data layer are different from one another. For this reason, in the aberration correction disclosed in Ando, a relation between an aberration amount and an optimal recording power has to be learned with respect to every data layer when compensating in the total aberration of the optical recording medium having multiple data layers. Thus, problems arise such as an increase of learning hours required for learning the relation between the aberration amount and the optimal recording compensation amount with respect to an optical recording medium having multiple data layers, and an unavailability of optimal recording characteristics for the respective data layer.

In contrast, as discussed in detail above, the present invention stores learned data indicating correlation between driving amounts of the wavefront converter and outputs of light of the light source, and controls the light source so as to set the output of light outputted by the light source to an output of light indicated in a learned data as correlating to the driving amount sent by the aberration detecting means. As a result, even when both a spherical aberration, which can be compensated by the wavefront converting means, and a residual aberration, which is unaffordable for the wavefront converting means, are generated, the residual aberration which cannot be detected by the aberration detecting means can be compensated by optimizing the output of the light source, thereby preventing adverse effects on the recording operation. Further, as discussed above, in the present invention the output of the light source is controlled by sending the output signal to the wavefront converting means. This makes it possible to simplify the recording compensation with

respect to multiple data layers. Further, according to the present invention, the relation between the driving amount of the wavefront converting means and the output of the light source is learned, which is different from the conventional technique in which a relation between the aberration amount and the optimal recording compensation amount has to be learned in the respective data layers. The arrangement of the present invention enables a shortening of the required learning time and the size of the program for learning, thereby contributing to expedited startup of the optical recording device. None of the prior art of record discloses or in any way suggests such features.

In view of the above amendments and remarks, it is submitted that the present application is in condition for allowance. The Examiner is invited to contact the undersigned by telephone to resolve any remaining issues.

Respectfully submitted,

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